5 April 1967

Post Office Box 6788
Fort Davis Station
Washington, D. C. 20020

Gentlemen:

Subject: RFP RD-14-67
Proposal P-0103

We are pleased to submit our proposal, P-0103, for a Digital Control Console for use with an On-Line Measuring System. Our proposal is submitted on a CPFF basis and is presented in accordance with Development Objectives dated 23 February 1967.

Attached you will find

2 copies	CPFF Cost Breakdown
2 copies	Technical Proposal
2 copies	Development Objectives
2 copies	Specification LB-1001

Three copies of our proposal consisting of the Technical Proposal and the Cost Breakdown have been sent to the Technical Representative as directed.

If there are any questions concerning the proposal, please contact [redacted] facility for information of a technical nature. Contractual or other information should be obtained from [redacted] STAT STAT

Very truly yours,

[redacted] STAT

Attachments

Next 2 Page(s) In Document Exempt

Approved For Release 2005/05/02 : CIA-RDP78B04770A002200010030-5

"The following publication designations and their descriptions outline the system used by [redacted] to differentiate the various types of technical publications."

STAT

Project No.	Serial No.	
37	- 42	No letter designation is given to Interim Progress Reports.
37 - R	- 42	"R" is designated to all technical reports completing a task on a current project.
37	- F	"F" is assigned to all Final Report designations.
53 - M	- 46	"M" designation is assigned to all equipment operation and maintenance manuals.
P	- 612	"P" is assigned to all proposals.
S	- 24	"S" describes Special Publications.

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A PROPOSAL

for a

DIGITAL CONTROL CONSOLE

7 April, 1967

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LIST OF FIGURES

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I. INTRODUCTION

STAT [redacted] submits this proposal for a Digital Control Console for use with an on-line measuring system in response to RFP No. RD-14-67.

STAT [redacted] STAT [redacted] DIG optical reading heads (which do not include the companion electronics package) along with output information from front panel controls and processes this information to form it into a message whose format is defined in Appendix A and elsewhere in Development Objectives for A Digital Control Console for Use with An On-Line Measurement System dated 23 February, 1967, (hereafter referred to as Development Objectives). Inputs also come from the computer to which the formatted data has been transmitted indicating acknowledgement or an error. The Control Console acts on this input, or lack of it, as defined in the Development Objectives.

II. GENERAL REQUIREMENTS

The Control Console is an interface between the DIG heads used by the photo interpreter and the computer. It translates DIG head position and peripheral information produced by the operator into a format compatible with the Univac Computer.

STAT Observations by [redacted] personnel have established the following criteria that this unit must fulfill:

1. It must be portable since it will be used at several positions.

2. The configuration of the enclosure must be such that the controls are within easy reach of the operator so that a minimum of time is spent actually operating the unit.

3. The Control Console must be able to operate, with a wide safety margin, in an environment of other digital electromechanical equipment; therefore the Console must not be sensitive to RFI.

4. Malfunctions must be kept to an absolute minimum since when the Console is not operating, other equipment and personnel are rendered inactive.

5. If a malfunction in the system occurs, it must quickly be determined whether or not the malfunction is located in the Control Console.

6. When a malfunction does occur in the Console, down time must be kept as short as possible, therefore:

   a. Circuitry must be easily accessible.

   b. Maintenance personnel not familiar with the equipment must be able to locate the malfunction quickly.

   c. Repair must be relatively uninvolved.

   d. New parts must be available and inexpensive.

The following description shows that the equipment proposed herein satisfies the above criteria.

III. DESCRIPTION

All circuitry and control functions are housed in rack-mounted enclosures which in turn are mounted in a portable rack equipped with locking castors; this allows the Control Console to be rolled between positions.

A. Control Panel

Even though the rack is portable, [redacted] personnel have noted that the control panel would not be able to be placed in a convenient position for use by operators because of the size of the light table and the seating positions of the operators. Therefore, the control panel, situated on top of the rack, will be mounted on slides so that it can be extended towards the operator (see Figure 1). The control panel is lockable in the extended position, stored position, or several positions in between. The rack is constructed so that the control panel is at a convenient height.

STAT

The layout of the control panel is substantially the same as is shown in Development Objectives, Appendix B, with one exception.

In addition to the following list of control panel displays and controls, there is a character display which can be used to monitor the output to the computer. This display consists of seven lamps, one for each bit, and selector switches to select the character to be displayed by the lamps. Using this display system, the message to the computer can be checked bit by bit to determine whether a system malfunction is located in the Control Console or elsewhere. The Console will, of course, be compatible with the existing test unit.

The rest of the controls on the Control Panel are as follows:

a. Y axis thumbwheel preset switches to preset the Y axis to 0 from which all measurements are referenced.

b. X Axis thumbwheel preset switches to preset X axis to 0.

c. Two preset switches to load the values set on the thumb-wheel switches into the counter.

d. Ten (10) twelve position rotary switches each producing 0 to 9, (-), and space.

e. Sixteen special instruction switches.

f. Five character readout switches, each of which initiates the message readout.

g. An alarm reset switch.

h. Two (2) zero reset switches, one for each axis.

i. Two (2) direction of count toggle switches.

j. A six digit Nixie display indicating the DIG head position on the X axis.

k. A six digit Nixie display for the Y axis.

l. An indicator light that is on during transmission of data to the computer.

B. Circuit Descriptions

1. Dig Converter

The electronics circuitry is housed in two enclosures. The first package, the DIG converter, contains the processing circuitry which converts the outputs from the DIG heads to linear measure in the form of binary coded decimals (see Figure 2). The coarse information, accurate to 0.1 inch, is first converted to voltage levels compatible with the integrated circuit logic, then is decoded to produce the coarse information in BCD form.

The fine information is a pulse train whose length determines the fine measure (accurate to within fifty millionths of an inch). The pulse train is first converted to the proper voltage levels, then the number of pulses in the pulse train is counted on decimal counters.

The fine and the coarse BCD information then goes to a Reference Processor. The desired reference number to which the axis measurement

is referred is set in the Reference Processor by means of thumbwheel switches on the control panel. The processor compares the BCD measure and the reference to determine the range between the two and in which direction the two are separate. The output of the processor, then, is the algebraic difference between the two thus referencing the DIG measurement to the preset number.

The DIG Converter is time shared so that it takes an X axis measurement and stores the result in the X axis buffer, then takes a Y axis measurement and stores the result in the Y axis buffer. Each axis is sampled at 200 msec. intervals.

2. Word Format Unit.

The other electronics package is the Word Format Unit. The circuit in this package performs two basic functions: (1) it gathers data from the DIG Converter and the switches on the front panel, inserting parity bits where needed, and (2) it scans this data bit by bit, inserting start and stop pulses, then sends it to the computer.

The information from the DIG Converter and front panel switches goes to buffer storage (see Figure 3). When one of the Readout Character switches is pressed indicating a desire to format and read the information to the computer, the Central Control unit locks the information in the buffer storage so that any further change in input information will not affect the output to the computer.

The output to the computer consists of a serial output of 35 characters each having a start pulse, seven information bits, and a stop pulse. All of the information, 7 x 35 or 245 bits, is available in parallel in the buffer storage. There are 35 Bit Scan modules each controlled by the Bit Scan Control. These modules generate the start pulse, sequentially sample each of the seven information bits of each character, and generate the stop pulse. The Character Scan and Character

Scan Control sequentially scan each character as that character's bits are being scanned.

After a readout character switch is pressed, the circuit would operate as follows. The Bit Scan Control generates a start pulse, then controls all of the Bit Scan modules to sequentially sample their seven bits in Buffer Storage (module #1 samples bits 1-7, module #2 samples 8-14, etc.); then the Bit Scan Control generates a stop pulse. The Character Scan Control, meanwhile, has enabled the Character Scan module so that the output of Bit Scan Module #1 passes to the Level Converter. After the stop pulse is generated, the Character Scan Controls enable the Character Scan Module so that the output of Bit Scan Module #3 passes to the Level Converter. This process continues until all 35 characters are sampled. In this way the message is formatted.

The information from the computer, either an acknowledge or an error, is first demodulated and checked for errors. The demodulator then informs Central Control whether to recycle the timer and send the information again, or turn the timer off.

C. Construction

Both electronics packages will be mounted in metal enclosures on slides in the portable rack so that when they are pulled out, tilted, and the top and bottom covers removed, the connector wiring as well as the test jacks on the cards will be available for trouble shooting. Extender boards will be provided so that all components on a card can be made accessible.

The circuits are mounted on [redacted] built printed circuit cards which mount vertically and are accessible from the top. STAT

Test jacks are mounted on the printed circuit boards by which critical points in the circuit can be monitored thereby facilitating the isolation of malfunctions.

The number of different types of printed circuit cards will be kept to a minimum so that there are as many identical cards as possible (as many as eight of one type). This will reduce the complexity of the equipment and will enable a quick test of a printed circuit card since another of the same type can be substituted for it.

The circuits will be composed mainly of integrated circuits. [redacted] STAT has found that use of integrated circuits provides high reliability since they operate over a wide temperature range, have high noise rejection and they consume little power therefore producing little heat.

Immunity from RFI in the operating environment is provided by the high noise rejection of integrated circuits, and attenuation by the metal enclosure.

D. Maintenance

The maintenance manual will include a general description, specifications, theory of operation, a system block diagram, block diagrams and schematics of each type of printed circuit card, trouble shooting procedures including timing diagrams and characteristic voltages and a complete parts list.

FIGURES

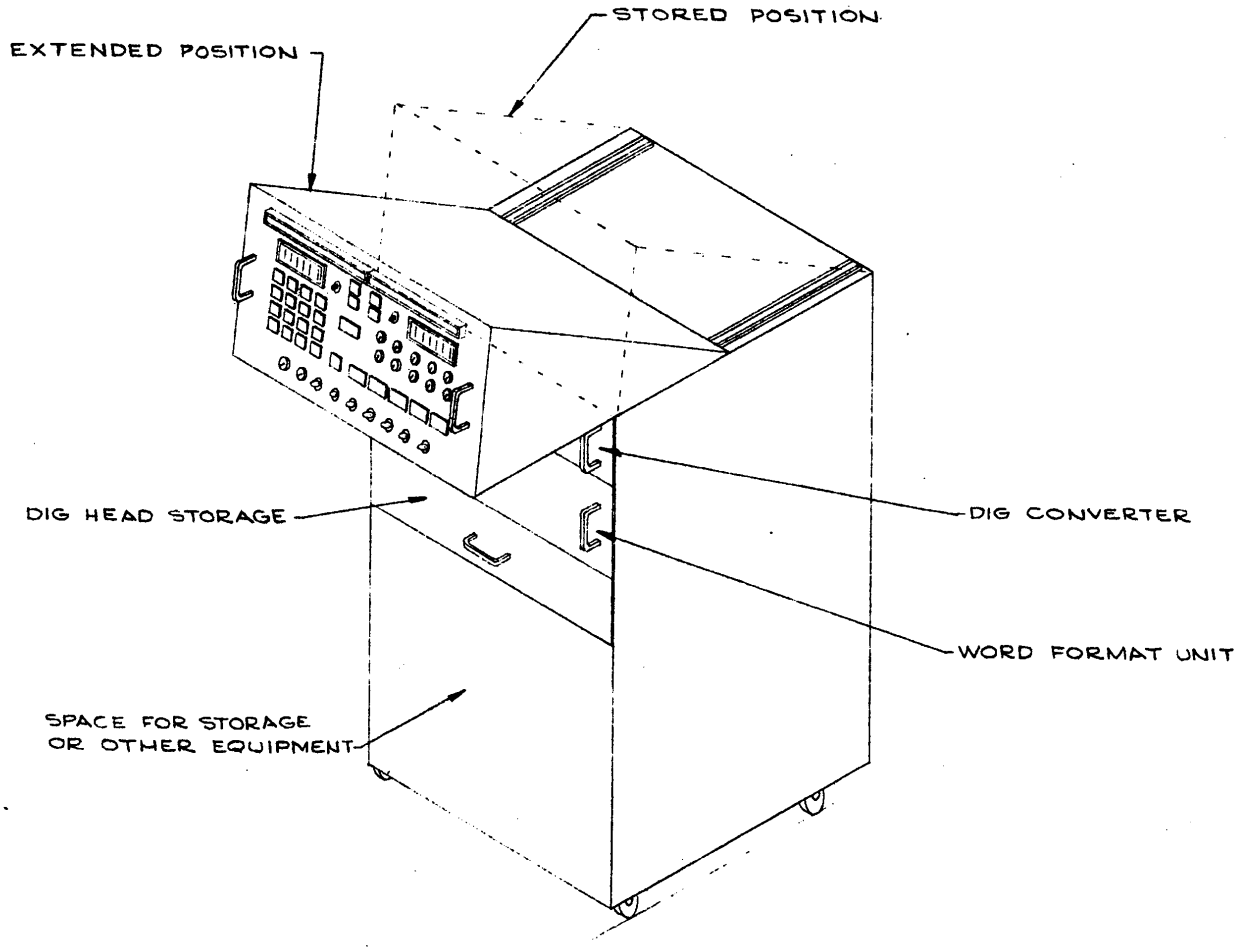

FIGURE 1
DIGITAL CONTROL CONSOLE
RACK CONFIGURATION

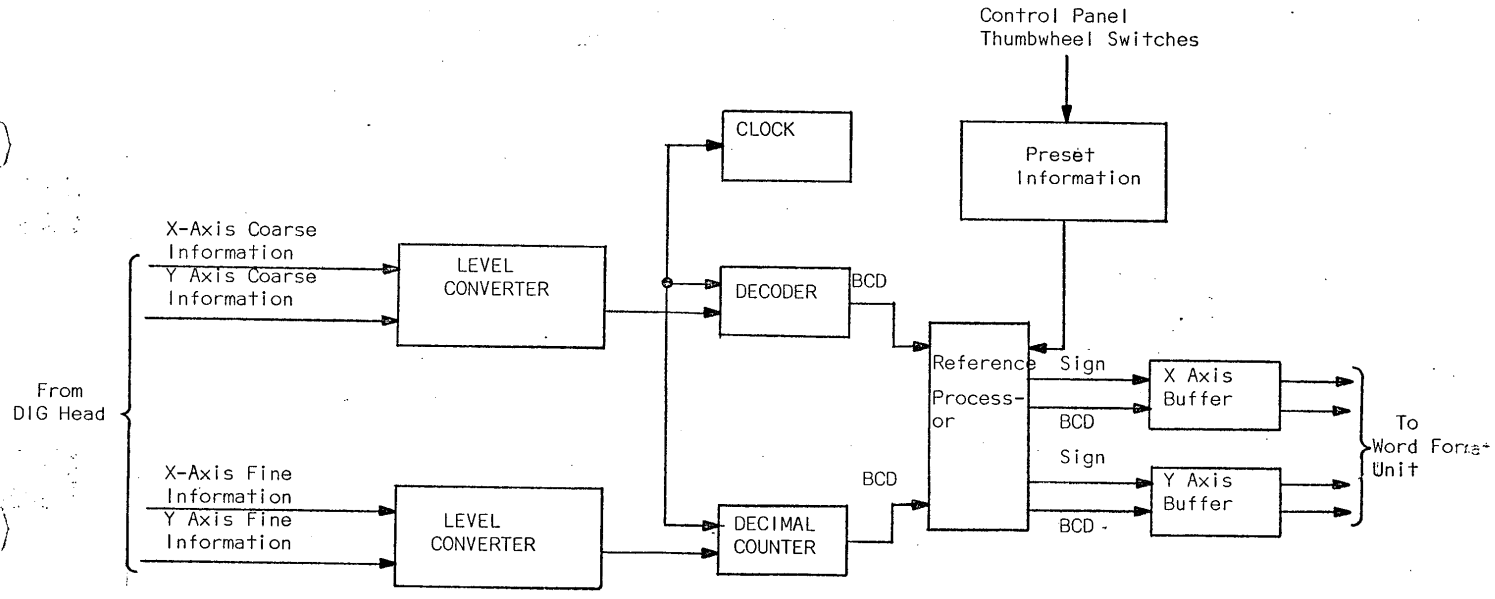

Figure 2

Digital Control Console - DIG Processor
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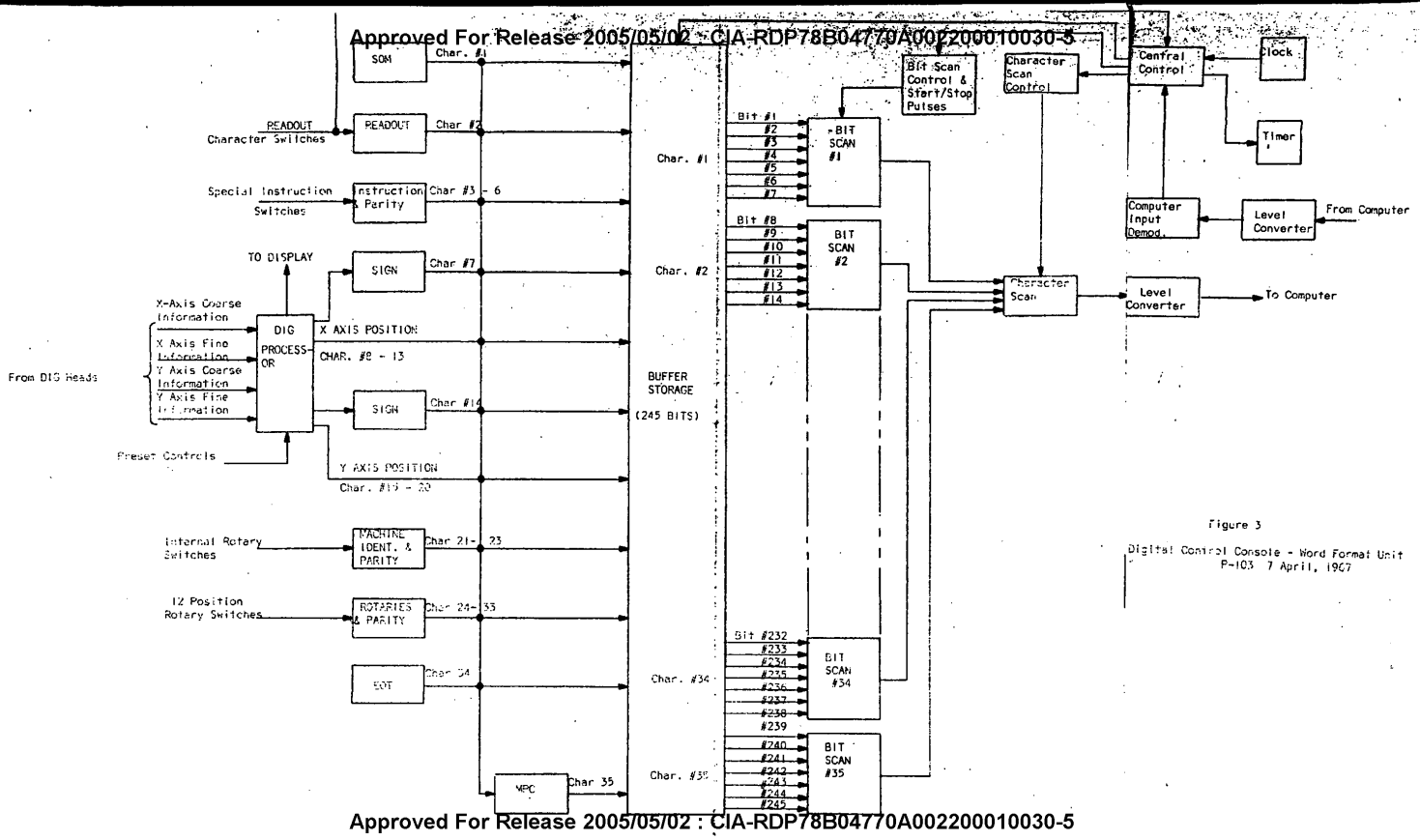

Figure 3

Digital Control Console - Word Format Unit
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IV. BIOGRAPHIES

Next 2 Page(s) In Document Exempt

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02057

MATERIAL INSPECTION AND RECEIVING REPORT

1. PROCUREMENT IDEN(CONTRACT)	(ORDER NO.)	6. INVOICE NO. / DATE	7. PAGE / OF	8. ACCEPTANCE POINT
[redacted] Task Order # 16			1 / 1	S

2. SHIPMENT NO.	3. DATE SHIPPED	4. B/L	5. DISCOUNT TERMS
STAT RE000042	30 JUN 69	TCN 9	N/A

9.	10. ADMINISTERED BY / CODE	
	N/A	
FOB:	12. PAYMENT WILL BE MADE BY / CODE	
	N/A	
13. SHIPPED TO / CODE	14. MARKED FOR / CODE	
COTR U.S. Government	N/A	

15. ITEM NO.	16. STOCK/PART NO. DESCRIPTION (Indicate number of shipping containers - type of container - container number.)	17. QUANTITY SHIP/REC'D*	18. UNIT	19. UNIT PRICE	20. AMOUNT
0001	Operation and Maintenance Manuals for PROTOTYPE Digital Control Console	5	ea.		STAT

21. PROCUREMENT QUALITY ASSURANCE

A. ORIGIN

☐ PQA ☐ ACCEPTANCE of listed items has been made by me or under my supervision and they conform to contract, except as noted herein or on supporting documents.

DATE _____ SIGNATURE OF AUTH GOVT REP _____

TYPED NAME AND OFFICE

B. DESTINATION

☐ PQA ☐ ACCEPTANCE of listed items has been made by me or under my supervision and they conform to contract, except as noted herein or on supporting documents.

DATE _____ SIGNATURE OF AUTH GOVT REP _____

TYPED NAME AND TITLE

22. RECEIVER'S USE

Quantities shown in apparent good condit

30 June 69
DATE

TYPED NAME AND OFFICE

*If quantity received by the Government is the same as quantity shipped, indicate by (✓) mark, if different, enter actual quantity received below quantity shipped and encircle.

CONTRACTOR USE ONLY

NOTE: Project #416211-850

FORM 250

PREVIOUS EDITIONS ARE OBSOLETE.

Filk 02057

MEMORANDUM RECEIPT

22 May 1969
DATE

TO:

FROM: U.S. Government

SUBJECT:

I hereby acknowledge receipt of the following:

1 ea. ELCO Tool #067515-01
1 ea. AMP Tool #380430-2 w/Tip #E1 380429-1
1 ea ELCO Tool #T-06-1877-02
1 ea ELCO Tool #061742-04
1 ea EECO H-501 CARD EXTENDER

Please return_____ signed copy(ies) of this receipt

To _____

DATE RECEIVED

FORM NO. 752 REPLACES FORM 36-66
1 AUG 55 WHICH MAY BE USED.

(33)